AMENDMENTS TO THE CLAIMS

Claims 1-38 (Cancelled)

39. (Currently Amended) A method for electrolytic production of aluminium metal from an electrolyte comprising aluminium oxide, said method comprising

performing electrolysis in an electrolysis cell containing at least one electrolysis chamber with at least one essentially inert anode aligned vertically or vertically inclined and at least one wettable cathode aligned vertically or vertically inclined, and/or at least one bipolar electrode containing both anode and cathode, where the anode evolves oxygen gas and the cathode has aluminium discharged thereonto in the electrolysis process, the oxygen gas enforcing an electrolyte flow pattern upward and the produced aluminium flowing downward due to gravity, and

controlling and maintaining the temperature of the electronic active surface of the electrodes at a level different from the level of the surrounding electrolyte by active or passive cooling and/or active ~~and~~ or passive heating.

40. (Previously Presented) A method in accordance with claim 39, wherein the vertically aligned or inclined oxygen-evolving anode is actively cooled by the use of at least one or more heat pipes embedded in and/or connected to the anode and/or the anode stem.

41. (Previously Presented) A method in accordance with claim 40, wherein the cooling medium in the heat pipes is selected among the elements sodium, potassium, cadmium, caesium, mercury, rubidium, sulphur, iodine, astatine and/or selenium, or from the compounds of heavy metal halides, for instance zirconium fluoride, thallium mono chloride, thallium fluoride, thallium iodide, lead iodide, lead chloride, lead bromide, iron iodide, indium chloride, calcium bromide, cadmium bromide and/or cadmium iodide or aluminium fluoride (pressurized).

42. (Previously Presented) A method in accordance with claim 39, wherein the vertically aligned or inclined oxygen-evolving anode is actively cooled by the use of at least one or more flow-channels embedded in and/or connected to the anode and/or the anode stem, the flow-channels carrying and circulating liquid coolants.

43. (Previously Presented) A method in accordance with claim 42, wherein the liquid coolants are water, heavy alcohols, oils, synthetic oils, mercury and/or molten salts.

44. (Previously Presented) A method in accordance with claim 39, wherein the vertically aligned or inclined oxygen-evolving anode is actively cooled by the use of at least one or more flow-channels embedded in and/or connected to the anode and/or the anode stem, the flow-channels carrying and circulating a gas coolant.

45. (Previously Presented) A method in accordance with claim 44, wherein the gas cooling medium is at least one of compressed air, nitrogen, argon, helium, carbon dioxide, and ammonia.

46. (Previously Presented) A method in accordance with claim 39, wherein the vertically aligned or inclined oxygen-evolving anode is attached to the electrical conductor system through an electric connection, the connection being cooled by heat pipes, liquid cooling and/or gas cooling.

47. (Previously Presented) A method in accordance with claim 46, wherein the connection is cooled by sodium metal for heat pipes, water, heavy alcohols, oils, synthetic oils, mercury and/or molten salts for liquid cooling and/or compressed air, nitrogen, argon, helium, carbon dioxide, and/or ammonia .

48. (Previously Presented) A method in accordance with claim 46, wherein the cooling of the electrical connection is obtained by using a highly electrical conductive metal with a large cross sectional area, the area being at least 1.1 - 5.0 times the cross sectional area of the anode stem cross sectional area.

49. (Previously Presented) A method in accordance with claim 39, wherein the vertically aligned or inclined anode has an anode stem between the submerged anode and the electrical connection, the stem having a cross sectional ratio to the anode cross section area of at least 0.005 - 0.5.

50. (Previously Presented) A method in accordance with claim 39, wherein the vertically aligned or inclined wettable cathode is maintained at a temperature at least at the same level as the electrolyte, the temperature being obtained by use of thermal insulation of the cathode stem.

51. (Previously Presented) A method in accordance with claim 39, wherein the vertically aligned or inclined wettable cathode is maintained at a temperature at least at the same level as the electrolyte, the temperature being obtained by use of electric resistor heating in an intermediate electric current lead between the electrical connection and the cathode stem.

52. (Previously Presented) A method in accordance with claim 51, wherein the intermediate electric current lead between the electrical connection and the cathode stem is manufactured from at least one of dense oxidation resistant graphite, a metal and a metal alloy.

53. (Previously Presented) A method in accordance with claim 39, wherein the vertically aligned or inclined wettable cathode is maintained at a temperature at least at the same level as the electrolyte, where the temperature is obtained by reducing the cross sectional area of the submerged cathode compared to the submerged anode area, the cathode area being 0.5 - 1.0 times the cross sectional area of the submerged anode.

54. (Previously Presented) A method in accordance with claim 53, wherein the vertically aligned or inclined cathode has a cathode stem between the submerged cathode and the electrical connection, the cathode stem area being 0.005 - 0.5 times the cross sectional area of the submerged cathode.

55. (Previously Presented) A method in accordance with claim 39, wherein the vertically aligned or inclined wettable cathode is attached to the electrical conductor system through an electric connection, the connection being cooled by liquid cooling and/or gas cooling.

56. (Previously Presented) A method in accordance with claim 55, wherein said the electrical connection is cooled using water, heavy alcohols, oils, synthetic oils, mercury and/or molten

salts for liquid cooling and/or compressed air, nitrogen, argon, helium, carbon dioxide, and/or ammonia for gas cooling.

57. (Previously Presented) A method in accordance with claim 55, wherein the cooling of the electrical connection is obtained by using an highly electrical conductive metal with a large cross sectional are, the area being at least 1.1 - 5.0 times the cross sectional area of the cathode stem cross sectional area.

58. (Previously Presented) A method in accordance with claim 39, wherein the vertically aligned or inclined cathode has a cathode stem between the submerged cathode and the electrical connection, the stem having a cross sectional ratio to the cathode of at least 0.005 - 0.05.

59. (Previously Presented) A method in accordance with claim 39, wherein the vertically aligned or inclined bipolar electrode has an anode surface maintained at a temperature slightly lower than the temperature of the electrolyte and a cathode surface temperature is maintained at a temperature at least at the same level as the electrolyte, the temperatures being obtained by at least one of cooling and heating.

60. (Previously Presented) A method in accordance with claim 59, wherein the anode of the bipolar electrode is cooled by heat pipes or flow-channels for liquid and/or gas cooling connected to and/or embedded in the anode.

61. (Previously Presented) A method in accordance with claim 60, wherein the bipolar electrode is cooled using sodium metal for heat pipes, water, heavy alcohols, oils, synthetic oils, mercury and/or molten salts for liquid cooling and/or compressed air, nitrogen, argon, helium, carbon dioxide, and/or ammonia for gas cooling.

62. (Previously Presented) A method in accordance with claim 60, wherein the heat pipes and/or flow-channels for liquid and/or gas cooling are connected to and/or embedded in the anode.

63. (Previously Presented) A method in accordance with claim 59, wherein the cathode of the bipolar electrode is heated by inserting a layer of a material with higher electrical resistively that the cathode material between the cathode and the adjacent anode of the bipolar electrode.

64. (Previously Presented) A method in accordance with claim 53, wherein the cathode of the bipolar electrode is heated by reducing the active surface area of the cathode so that the bipolar electrode has a cathode to anode surface area ratio of at least 0.5 - 1.0.

65-77. (Cancelled)

78. (Previously Presented) A method in accordance with claim 52, wherein the at least one of dense oxidation resistant graphite, a metal and a metal alloy is at least one of stainless steel, Incoloy and Hastaloy.

79. (Previously Presented) A method in accordance with claim 62, wherein the heat pipes and/or flow-channels for liquid and/or gas cooling are connected to and/or embedded in the anode circumference.